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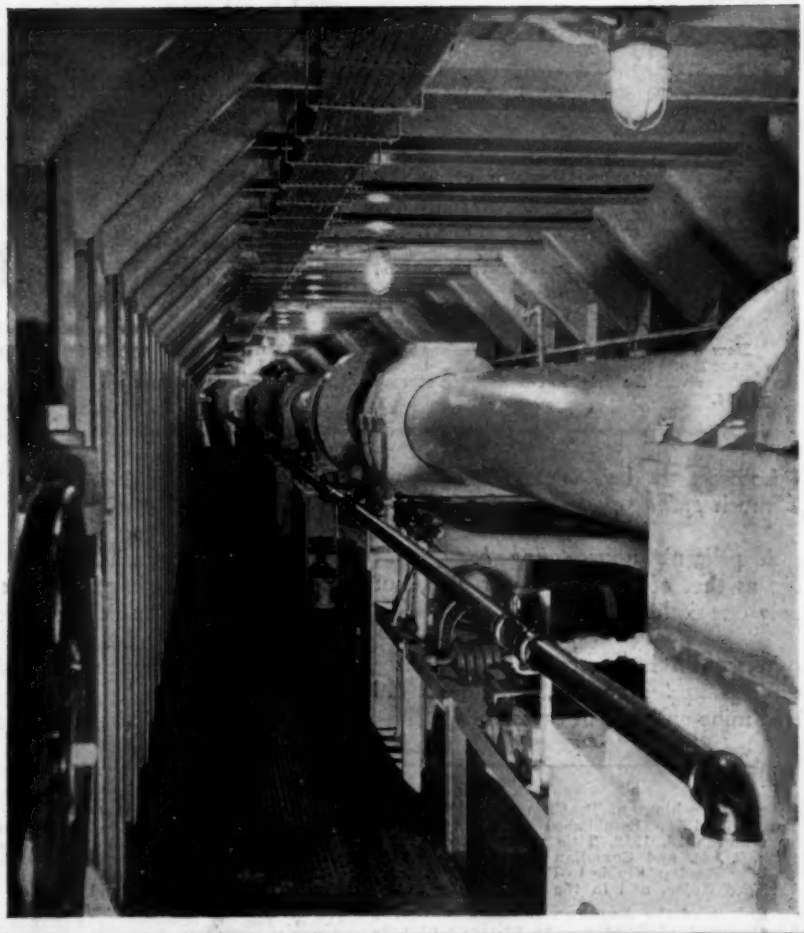
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



December 7, 1940

Drive

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A SCIENCE SERVICE PUBLICATION

Do You Know?

The United States possesses the largest known *oil* reserves in all history.

A self-heating *aviator's suit* of rubber is being turned out for the Army Air Corps.

About 350 compounds of *synthetic rubber* for various industrial purposes have been perfected.

Radium and other radioactive substances are excluded from U. S. mails, but may be carried by express with due protection.

A way of removing *chewing gum* from clothing: rub the spot with ice until the gum can be rolled into a ball and scraped off.

Calcite, or Iceland spar, a valuable optical mineral heretofore imported, has been found in the mountains near Santa Fe, N. M.

In recent months, 12,500 baby *terrapin* have been distributed in coastal areas from Maryland to Georgia by the U. S. Fish and Wildlife Service.

The *standard gauge* of our railroads —four feet, eight and one-half inches— goes back to the clearance width established for Roman chariots.

A mother *coyote* moves her home frequently to protect her young, and in a den with many holes she will put one pup in each hole to prevent the whole family from being attacked at once.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

AGRICULTURE

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CHEMISTRY

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PUBLIC HEALTH

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What is the greatest problem facing Chinese on the Burma Road? p. 359.

Locomotives have nearly half again as much *pulling power* now as in 1918.

A pelican's upper *wing bone* is as big as that of a man's upper arm, but only one-sixth as heavy.

Wisconsin has recently opened three *underground museums,* one in an old lead mine and two in caves.

The world's *biggest fish* is a whale shark.

Newest *dolls* of plastic made with latex have flexible fingers and toes and soft skin that wrinkles realistically.

If tests prove successful, *Diesel engines* for tanks will lengthen the distance a tank can strike without refueling.

SCIENCE NEWS LETTER

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PHOTOGRAPHY

Grains In Photographic Image Look Like Masses of Seaweed

Electron Microscope Enables Photographic Experts To See For First Time What Photograph Looks Like

AFTER working with photography for years, scientists at the Kodak Research Laboratories have just found out how the developed silver bromide grains that make up the photographic image really look.

They used to think that if they could magnify them enough, the grains would appear like lumps of coke. Now, thanks to the electron microscope, which is as much more powerful than the ordinary microscope as that instrument is superior to a hand lens, they find that each grain is like a mass of seaweed. If you take a piece of ordinary sewing thread, roll it between your fingers into a small, loose ball, you have a good model of a single grain.

These results were announced by Dr. C. E. K. Mees, vice-president and director of research of the Eastman Kodak Company. They are revealed in photographs, with magnification of 25,000 diameters, made with a type of electron microscope developed by Dr. E. F. Burton, professor of physics of the University of Toronto and a pioneer in the electron microscope field. The Kodak Laboratory's installation was built by C. E. Hall, a student of Dr. Burton's, who is now on the Laboratory staff.

Dr. Mees was unwilling to predict what these results may lead to, but knowing what the grains look like, it will be possible to understand better the mechanism by which they are formed, and control it better. Already they have a clue to the different behavior of different developers.

Hydroquinone, for example, gives relatively coarse threads, while metol gives threads that are much finer. These seem to build up from one spot on the original crystal of silver bromide. With developers like paraphenylene-diamine, and also with physical development, the silver bromide dissolves and precipitates elsewhere, so the result is a fluffy mass rather than a thread.

After the work was begun, the Eastman scientists found that earlier in the year a German named Ardenne, also with the electron microscope, had made an independent discovery of the thread-like character of the silver bromide grains, but no details of this work have yet been obtained.

Science News Letter, December 7, 1940

PHYSICS

Electron Accelerator Whirls Atomic Particles

SCIENCE'S newest weapon for producing intense bombardments with fragments of atoms, a device called the induction electron accelerator, was described by Dr. D. W. Kerst of the General Electric Research Laboratory at Schenectady, N. Y., who spoke before the meeting of the American Physical Society.

The electron accelerator consists of a doughnut-shaped glass vessel with the air pumped out of it. It contains an iron core, and is surrounded by a magnet consisting of thousands of segments of iron.

A stream of electrons introduced into the glass vacuum chamber is whirled in the magnetic field at ever-increasing velocities until the particles are finally moving at almost the speed of light—186,000 miles a second. In reaching this speed, the electrons make 200,000 revolutions, traveling a distance of approximately 60 miles and building up an energy of 2,300,000 volts.

The present small apparatus, less than a foot in diameter, produces radiation energy equivalent in intensity to that given off by ten milligrams of radium. Larger models can be expected to give more energy.

Science News Letter, December 7, 1940

ASTRONOMY

Gathering of Gas by Star Does Not Keep It Shining

STARS seem unable to keep going by a scavenging process.

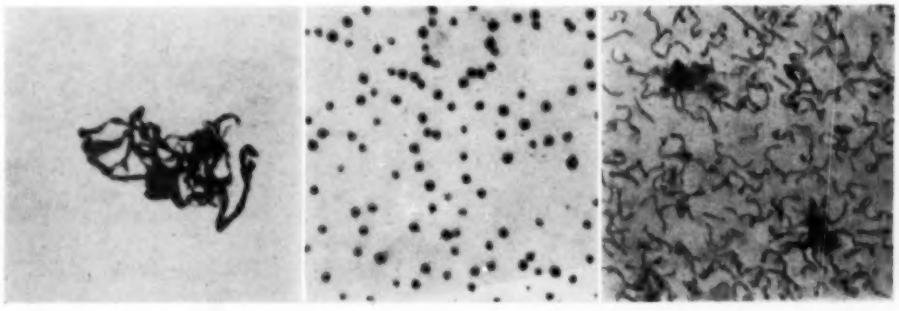
Modern astronomical theories hold that the stars get their energy by a conversion of hydrogen into helium. However, a bright star uses up hydrogen so fast that some means at present unknown must keep up the supply.

One theory to explain the supply called upon the very tenuous cloud of gas between the stars, suggesting that, as they moved along, they swept up enough hydrogen to meet the needs.

Calculations made by Dr. Robert d'Escourt Atkinson, of Rutgers University, indicate, however, that this will not do. In a recent report to the Royal Astronomical Society in London, he shows that if a star became more massive by sweeping up these gases, it would also send out radiation more rapidly, and its life would not be lengthened. Consequently, some other explanation must be found for the source of the star's fuel.

Science News Letter, December 7, 1940

A chemically etched *nail* developed by the U. S. Forest Products Laboratory has much greater holding power in soft wood than a plain nail.



PHOTOGRAPHIC GRAINS

These three photographs, taken in the Eastman Kodak Company's Research Laboratory with a magnification of 25,000 diameters, show the actual appearance of a photographic grain. The thread making up the grain is about 5 atoms thick. At the left is a silver bromide crystal which has been developed with one of the usual chemicals. In the middle is a Lippmann emulsion, made by precipitating completely colloidal silver bromide. In the third view, this has been developed chemically, and each tiny crystal has lengthened into a thread.

PUBLIC HEALTH

Attack on Old Age Problems Launched by Health Service

Conference Called by Surgeon General Included Representatives of Medical and Other Sciences

THE federal government is taking an increasing interest in people of this nation who are getting old.

Social security, with its economic benefits, was the first step. Now comes an attack on the health problems of old age, launched by the U. S. Public Health Service at a conference in Washington.

This conference of the National Advisory Committee on Gerontology, called by Surgeon General Thomas Parran, was the first of its kind ever held in this country.

The committee includes not only physicians but, among others, a botanist and a zoologist. Plants and animals other than man grow old, and the men who have studied the aging process in these other forms of life may be able to help with the study of the aging process in man. Some of the troubles of old age are due to specific illness and others just to the process of growing old. Both parts of the problem must be studied, if the federal health service or any other agency is to help old people live more comfortably and efficiently.

Efficiency in old age may soon be as important as comfort, because our nation is rapidly becoming a nation of older persons. In the future, they may have to take more and more part in the work of the country. If they are not needed for work, they will need to be efficient at managing their own lives and the problems brought by increased leisure time.

A research unit to be concerned entirely with problems of aging has been organized at the National Institute of Health under the direction of Dr. Edward J. Stieglitz. Before starting its work, this unit plans a survey of work already done on the problem.

Members of the National Advisory Committee on Gerontology are:

Dr. L. R. Thompson, Director, National Institute of Health, U. S. Public Health Service; Dr. Anton J. Carlson, Physiologist, University of Chicago; Dr. Charles L. Christiernin, Medical Director, Metropolitan Life Insurance Company; Association of Life Insurance Medical Directors of America; Dr. Robert E. Coker, Zoologist, National Research Council, University of North Carolina; Dr. William Crocker, Botanist, Boyce Thompson Institute of Plant Research; Mr. Lawrence K. Frank, Sociologist, Josiah Macy, Jr. Foundation; Dr. A. Baird Hastings, Biochemist, Harvard University; Dr. Ludvig Hektoen, Pathologist, Consultant, National Cancer Institute, U. S. Public Health Service; Dr. Winfred Overholser, Psychiatrist, Superintendent, St. Elizabeths Hospital; Dr. Clarence Selby, Industrial Physician, General Motors Corporation; Dr. William D. Stroud, Clinician, Philadelphia.

Science News Letter, December 7, 1940

POPULATION

Population of United States May Be Lower Than Expected

THE curve of increasing population in the United States may flatten out sooner than expected on the basis of past censuses, and the stationary population figure finally attained may be lower than earlier predictions indicated.

This conclusion was reached through study of the 1940 census by the late Prof. Raymond Pearl and associates, of the Johns Hopkins University. His statement is published posthumously in *Science*. (Nov. 22.)

In 1920, Prof. Pearl, with Dr. L. J. Reed, based a prediction curve on the census of 1910, and on all previous U. S. censuses since 1790. This indicated that the 1940 population of this country should be more than 136 million. Actual count shows a population somewhat short of that figure: 131 million.

The same prediction curve indicated a maximum population of the United States to be reached some time after the year 2100, and to become stabilized between 196 and 197 millions. The new curve flattens out earlier and at a lower level. The ultimate maximum population is indicated at 184 million.

However, Prof. Pearl and his associates confess, it will be necessary to wait ten years in order to determine which of their two prediction curves comes closest to fitting actual facts.

"We hope to make a statement on the point in 1950," the article concludes.

Prof. Pearl died on the morning of Nov. 17. His surviving co-authors, who hope to be able to carry out his final promise, are Dr. Lowell J. Reed and Dr. Joseph F. Kish.

Science News Letter, December 7, 1940

PSYCHOLOGY—SOCIOLOGY

Boosting American Morale Fairy Godmother Job

TO BOOST American morale, sociologists must turn to fairy godmother tactics of considering inner wishes—in a very practical and sociological way. So it appears from the latest investigation into causes of high and low morale reported by Delbert C. Miller of the State College of Washington. (*American Sociological Review*, December.)

The feeling of being successful in achieving one's own goals is a better index of morale than actual conditions of social and physical surroundings, Mr. Miller points out. This psychological angle, he declares, must be taken into account in social reforms.

As six outstanding social psychological factors that affect the rise and fall of an individual's morale, Mr. Miller cites these:

1. Financial plans for old age. 2. Job satisfaction. 3. Family members' approval of job. 4. Job advancement on merit basis. 5. Personal feeling that things are going well. 6. Leisure enjoyment.

Important for giving a lift to the individual's feeling of well-being and getting somewhere in life, are such sociological conditions as regular and adequate income, working hours that allow for leisure, a job that satisfies.

"The impulsive reformer," he declares, "may be surprised to find how slight his success is in pleasing people who have been given more or better material comforts but whose wishes for security, response, or recognition are denied."

Mr. Miller has studied morale in 951 former university students.

Science News Letter, December 7, 1940

POPULATION

Difficult Changes Ahead, Population Experts Warn

Rural Population Increased for First Time Known; Elderly and Middle Aged Increasing in Numbers

A WARNING that people in the United States must make difficult adjustments in social and economic life to meet developments that the 1940 Census reveals, is sounded by two population experts, Dr. Warren S. Thompson and Dr. P. K. Whelpton of the Scripps Foundation for Research in Population Problems at Miami University, Oxford, Ohio.

"The pattern of population growth in the United States during the past ten years differs significantly from that of previous decades," they will declare in the December issue of the *American Sociological Review*.

Main changes to watch, because they have significant influence on economics and social problems, are these, named by the population analysts:

1. The more rapid growth of the South than of the Northeast.

2. Increasing proportion of the population in smaller cities and suburban areas.

3. Rapid declines in certain rural sections and increases in others.

4. Trend toward an older population.

The largest absolute increase in population, 5,273,000, is revealed among the middle-aged people, in the 45- to 64-year group, in an estimate from Census figures thus far given out. This is the group said to have increasing trouble finding work in industrial plants and commercial establishment, the population experts point out. Rapid growth of this part of the population is seen aggravating the already serious problems of teaching older workers new tasks.

The oldest group of Americans, people over 65, are also increasing at a rate which equals swift growth of the entire nation 50 years ago. These elderly people, who are apt to be not entirely self-supporting, will continue to increase at about the present rate for 20 or 30 years, Dr. Thompson and Dr. Whelpton foresee.

"It is almost certain that in the nation as a whole the proportion of the population living in rural areas increased for the first time in our Census history," they also state.

Some time will elapse before the new 1940 Census figures are released showing exactly what is happening to population in the smallest cities of less than 10,000 and among farming and nonfarming people in rural neighborhoods. The population analysts suspect that nonfarming people of country neighborhoods will prove to be increasing faster than the farmers.

Science News Letter, December 7, 1940

MOST MODERN HOSPITAL

This skyscraper in Richmond puts Dixie ahead in modern institutions for care of the sick. It is completely air conditioned and has all sorts of equipment for comfort and care of patients.

MEDICINE

Dixie's Skyscraper Hospital Is Topped by Plane Beacon

WITH the opening in Richmond of the 20-story, $2,500,000 skyscraper hospital of the Medical College of Virginia, Dixie will have what hospital authorities declare is the nation's most modern building for the care of the sick and for medical teaching.

A preview of the hospital, from the federal government specified airplane beacon on top to the 16-ton-per-day ice manufacturing plant in the sub-basement, was shown to 3,500 invited guests.

Complete air-conditioning throughout the hospital is one of the many modern features in the building. The system will be used for heating and humidifying in winter, for introduction of fresh air in summer, and in the beginning, for cooling of the first and the operating room floors in summer. Other ultra-modern features of the hospital are:

Microphones providing two-way communication between nurses and physicians in operating and delivery rooms and observers, who will be behind glass partitions.

Elimination of the traffic congestion for students and visiting physicians usually created by the teaching amphitheater in the center of a large hospital.

Lighting system which makes it impossible for a light ever to shine in a patient's face.

Unique signal system for private patients whereby those able to talk will telephone messages directly to the nurse's station and those unable to talk will be able to get a message to the nurse by a special attachment on the telephone.

Science News Letter, December 7, 1940

CHEMISTRY

Miss Muffet's Dish Now Can Be Made Into Wine

WINE can be made from milk, instead of the traditional grapes, by a newly developed process. (*National Dairy Sealtest Laboratories.*) Whey, a milk by-product left over in the manufacture of cheese and casein, is the source. Such wine is not yet on the market but it is said that it can be made either in the sherry or sauterne type, with about 15 per cent alcoholic content.

Science News Letter, December 7, 1940

PREDICTING CLOUDS

Dr. Hans Neuberger, of Pennsylvania State College, is shown here sighting through his polariscope. With this instrument, he has found he can predict cloud formations before they appear.

METEOROLOGY

Light Change in Clear Sky Permits Prediction of Clouds

Light From Most of Clear Sky Is Polarized; Non-Polarized Points Rise Before Cloud Formation

WITH a simple instrument of his invention, Dr. Hans Neuberger, of Pennsylvania State College, has found a means of predicting, several hours before they appear, the formation of clouds in a clear sky.

The method makes use of the fact that the light from most of a really clear sky is polarized. That is, its waves vibrate more in one direction than in others. There are certain points in the sky, however, where there is no polarization.

Before clouds appear, says Dr. Neuberger, there is a sudden increase in the size of condensation particles in the air. These are made of such things as dust, combustion products and tiny crystals of ocean salt. When the moisture content of the air rises, it begins to condense on these particles, forming water droplets, and clouds are nothing more than conglomerations of these tiny drops.

Using the special instrument to measure sky polarization, he says, "we are able to detect the first sudden swelling in the condensation particles. The swelling is reflected in an immediate rise in the neutral or non-polarized points in the sky."

The method is only useful, he stated, when the sky is originally almost cloudless.

"It would be of auxiliary value," he declared, "in isolated regions or for army troops cut off from regular information channels. The knowledge of impending cloud formations is of vital importance for military activity, particularly in the air."

Science News Letter, December 7, 1940

By "fortifying" white *flour* with vitamin B_1 and adding calcium salt, the British government aims to give white bread some of the nutritive qualities of whole meal.

OPTICS

Soviet Science Claims Old Art Secret Unlocked

LONG-FORGOTTEN secrets of color, which enabled artists 1,500 years ago to make frescoes effective through long vistas of halls and cathedrals, have been rediscovered, according to a report from TASS, official news agency of the Soviet government, received in the United States.

Laws governing effect of distance on color, formulated in these experiments at the Soviet Academy of Arts in Moscow, will be put to use, it is stated, in decorating immense halls in the Palace of Soviets.

Examining famous mosaic pictures in churches of Ravenna, Italy, of the fourth to sixth centuries, the Soviet investigators became convinced that artists of that era recognized laws governing changes of pictorial images with increasing distance of sight. Modern color science has shown such facts as that light blue spots on white background turn almost black at a distance, and yellow spots deepen to orange, while against colored background even more marked changes take place. Yet frescoes painted within recent times show distortions when viewed from afar, indicating a loss of ancient art knowledge, and no full utilization of modern science.

The Academy of Arts plans publication of a chart showing how colors appear on different backgrounds, and also an album of ancient art illustrating methods of using paint to obtain desired effects at long distance.

Science News Letter, December 7, 1940

ENGINEERING

Shaft Carries Power to Drive New Ship to India

See Front Cover

ONE of the newest of American cargo vessels, the 475-foot long, 6737 ton *S.S. Executor* of the American Export Lines, is now on her maiden voyage to India. Capable of sustained sea speed of 16.5 knots, over a 15,000 mile steaming radius, the power from her steam turbines is carried from the engine room to the propeller over the long shaft shown in our cover picture.

This important part of the vessel is one almost never seen by the public.

Science News Letter, December 7, 1940

PUBLIC HEALTH

Malaria Greatest Problem Facing Chinese on Burma Road

American Experts on Mission Find That Disease Damages Hundreds of Thousands of Lives Annually

CONTROL of malaria is "the greatest problem confronting the Chinese," Dr. L. L. Williams, Jr., U. S. Public Health Service, declared after six months spent inaugurating malaria control work on China's life-line, the China-Burma Highway.

This health problem, which militated against the building of the road and slowed up the carrying in of war supplies, is now being solved by measures for protection of labor camps and headquarters towns inaugurated by Dr. Williams and associates, Dr. Bruce Mayne and Surgeon H. J. Bush, of the U. S. Public Health Service.

The American experts were sent on this malaria control mission at the request of the Chinese government when epidemics began appearing along the Burma road.

"It is now thought," Dr. Williams told a conference at the National Institute of Health, "that malaria is responsible for more deaths than all other infectious diseases in the province (Yunnan Province) and that hundreds of thousands of young adult lives are damaged annually."

Malaria control was begun at Chefang and also at the airplane factory of Loiwing, the "two worst places" of danger from the disease. Chinese physicians were taught malaria control methods, ranging from the use of oil and pyrethrum to kill malaria mosquito larvae to making screen doors to protect the people in their houses. Most of these physicians now have been appointed by the Chinese National Health Administration, Wei Shang Shu, as the first malaria control unit for the China Burma Highway, with headquarters at the Chefang laboratory set up by Dr. Williams and associates.

Science News Letter, December 7, 1940

MEDICINE

New Journal, "Medical Care", Will Start Publication Soon

THE much-discussed costs of medical care and what to do about them now have a special journal devoted to them which will appear early in 1941.

Announcement of the new journal, to be called *Medical Care,* is made by The Williams and Wilkins Company who will publish it for the Committee on Research in Medical Economics, Inc. Dr. Michael M. Davis, of New York City, is chairman of this Committee.

A forum of signed expressions of opinion by individuals or agencies; nontechnical reports of scientific studies of the medical, administrative and financial experience of plans of organized care in the United States; news of the field, and summaries of reports appearing elsewhere are promised to readers of the new journal.

Medical Care, it is stated, "considers equally the interests of the people who receive medical care and of the professions that furnish it. It seeks to promote cooperative research, planning and action by the professions and the public, in their common interest."

The editorial advisors of the new journal include members of the medical and allied professions, social scientists, public administrators, and men and women informally representing labor, agriculture, employers, and social work. Besides these, the new journal has an editorial board composed of the following:

Dr. Ernst P. Boas, New York City; Dr. Samuel Bradbury, Philadelphia; Dr. Claude W. Munger, New York City; Dr. John P. Peters, New Haven; Dr. C.-E. A. Winslow, New Haven; Dr. Herbert E. Phillips, Illinois; Dr. Kingsley Roberts, New York City; and George Soule, economist, New York City.

Science News Letter, December 7, 1940

CHEMISTRY

Nylon Manufacture Details Are Now Made Public

FIRST announcement of technical details concerning nylon, synthetic fiber now used for hosiery, has been given by Dr. G. P. Hoff, du Pont director of nylon research.

As with a vast number of chemical products, nylon is made by a process of polymerization, that is, of linking together smaller molecular units into ones that are relatively large—of the order of ten-millionths of an inch in length. These he likened to a chain of paper clips, the individual clips corresponding to the original smaller molecules.

When the filaments are first formed, these molecules are in a random arrangement, like straws in a pile.

"Visualize these long-chain molecules within the filaments lying in all directions, twisted and coiled and wrinkled," Dr. Hoff invited his audience. "In this form the fibers have relatively little practical use and it is necessary to bring about orientation through stretching of the filaments. Relatively little force is required to accomplish a four-fold increase in length. This new length and proportionately reduced diameter are the permanent attributes of the stretched or drawn yarn."

When dresses, or perhaps even men's suits, are made from nylon and related materials, pressing will be much less of a problem than today, for hot water or steam gives nylon a nearly permanent set. If a piece of yarn is straight or folded when it is treated, it tends to remain that way. This, he explained, is why nylon stockings retain their shape after repeated wearing and washing.

"This phenomenon," Dr. Hoff pointed out, "is really an exaggeration of a similar phenomenon which takes place in the pressing of cotton, wool or silk garments. To crease a pair of trousers or remove the wrinkles from a dress, it is customary to iron through a wet cloth, or to use a press supplying steam pressure and moisture.

"These operations on the natural fibers are much more easily reversible than with nylon. A brief shower or even body heat and moisture will remove creases from the best of suiting materials."

Nylon, in contrast, will hold its shape virtually as originally imparted.

Science News Letter, December 7, 1940

MEDICINE

Instrument Tells Whether Crossed Eyes Can Be Fixed

A NEW instrument for telling in advance of treatment whether the eyes of a cross-eyed person can be straightened to work together as a seeing unit was announced by Dr. J. F. Neumueller, director of the American Optical Company's Bureau of Visual Science.

The instrument gives the diagnosis in one-half minute. The test with this instrument is based on the phenomenon of the after-image and on the fact that normal eyes can definitely locate objects in space. If the eyes and brain are unable to do this, as determined by the after-image test, Dr. Neumueller stated, normal visual functioning cannot be restored.

The after-image tester consists of a glass tube containing an electric wire. The current is switched on and as the wire glows the patient looks through one eye only at a red dot on the center of the tube. The tube is then turned from its horizontal position to a vertical position and the patient peers at the red spot through his other eye.

Then the light is turned off and the patient, both eyes now open, looks at a fairly bright wall. Soon he notices two dark lines, the negative after-images. If these two lines form a cross, his cross-eyes can be successfully treated. But if the two lines do not meet, chances of restoring binocular vision are remote.

Science News Letter, December 7, 1940

CHEMISTRY

Double Power Gasoline Possible When Knock Goes

WHEN science can produce gasoline entirely free from knock, double the power or mileage of present day gas will be possible. This was the promise made to members of the American Chemical Society by T. A. Boyd, of the General Motors Research Laboratories.

"From an altogether knock-free fuel, it would not be hard to get either double the power or nearly twice the mileage per gallon, but not both at once," he stated. "Such a fuel should make possible an engine of much smaller displacement than that of today. If with 100 octane number gasoline," (present day fuels have an octane number of about 70) "miles per gallon could be increased only by 50%, the saving to the car user would amount to one half of the present retail value of fuel. So even if the present cost of manufacture of gasoline, about five cents a gallon, had to be doubled to make the 100-octane fuel, there would still remain a net saving in cost to the car user of 20%."

Mr. Boyd declared that the shortage of gasoline which was feared in 1914 as the use of motor vehicles rapidly mounted has been kept off by chemical research. Then there was about an 18% yield of gasoline from the crude oil; now it is about 45%, while 70% to 75% is possible in modern refineries.

Because drivers up to now have been demanding better acceleration and hill climbing ability, producers have been boosting the performance of gasoline, increasing it about 45% since 1927, but the improved economy, in terms of mileage, has been around 20%.

"Only incidental improvement in economy can be obtained when the primary objective is to boost power," he said. "It begins to appear that from now on the car users may prefer to take the benefits of further improvements in fuels and of advances in engineering in terms of more miles per gallon."

Science News Letter, December 7, 1940

ENGINEERING

Melted Salts Convey Heat In Oil Cracking Process

TRANSFER of heat by liquid is familiar to anyone who lives in a house with hot-water heating. The water is heated down in the cellar and piped to radiators where it gives up its heat to warm the room.

Many industrial processes make use of similar processes, but liquids other than water are often used, because they can be heated to a higher degree before they turn into steam. Therefore, a considerably greater amount of heat can be transferred.

A melted mixture of salts, especially the nitrates and nitrites of sodium and potassium, has been recently devised for the purpose by three du Pont chemists, W. E. Kirst, W. M. Nagle and J. B. Castner. This can be used for temperatures between 290 degrees and 1000 degrees Fahrenheit. Below this maximum, they state, the mixture is quite stable and can be used for years, but above 1,000 degrees there is a slow decomposition.

The first extensive use of the new compound, which is known as HTS, is in the Houdry catalytic cracking process, for oil refining.

Science News Letter, December 7, 1940

IN SCIENCE

PHYSIOLOGY

Heparin Different in Different Animal Species

HEPARIN, a chemical formed in the body that keeps blood from clotting in the veins and which therefore is proving a useful and life-saving remedy in many conditions, is different in different species of animals, Dr. L. B. Jaques, of the University of Toronto, reports. (*Science*, Nov. 22.)

Heparin from dogs, for example, is about two and one-half times as powerful an anti-blood-clotting agent as heparin from cattle, and 10 times as potent as that from sheep, Dr. Jaques and an associate found. The amount of sulfur in this chemical is also different in different animals.

The same kinds of crystals, in rosettes and sheaves, however, are formed by the barium salts of all the heparins. This, Dr. Jaques points out, is a rare finding for substances having such different activity.

Science News Letter, December 7, 1940

AGRICULTURE

Harvest of Wild Grass Seed Provides New Cash Crop

COOPERATIVE efforts of farmers and the U. S. government to heal the wounded dusty plains of the West have resulted in the creation of a new cash crop.

This consists of the seeds of the native grasses which grew wild and thick in the old days, bound the soil together and protected the prairie from the ravages of dust storms—such grasses as gramma and buffalo, blue-stem, galleta, Indian wild rye, western wheat, and many others.

More than 100,000 pounds have been collected this fall in eastern Colorado, northern Texas, the Oklahoma panhandle, and in western Kansas. Everything has been used, from grain combines to hand-threshing, where the grass is not adapted to machine methods. The Soil Conservation Service has purchased more than 60,000 pounds of wild grass seed, and farmers and ranchmen have bought heavily.

Science News Letter, December 7, 1940

NE FIELDS

MEDICINE

Pussy Gets Pellagra; Cure is Nicotinic Acid

PUSSY, or her brother Tom, can get Dixie's hard-times disease, pellagra, from a poor diet just like the rest of the family. Nicotinic acid, the cure and preventive of the ailment for humans and dogs, will also cure or prevent the disease in cats.

Discovery that cats require this B vitamin, nicotinic acid, for health is announced by Dr. M. K. Heath, Dr. J. W. MacQueen, and Dr. Tom D. Spies, of the University of Cincinnati, the University of Alabama and Hillman Hospital, Birmingham, Ala. (*Science,* Nov. 28.)

Cats' need for this vitamin, and pellagra in cats, have apparently never before been reported, although scientists have found that pigs and monkeys, as well as dogs and humans, need the vitamin.

Science News Letter, December 7, 1940

CHEMISTRY

Invisible Light for Analysis Of Chemical Solutions

A METHOD of analysis employing fingerprints of molecules, which is so delicate that it can detect an impurity of a thousandth of one percent in a few drops of chemical solution, was described to the American Chemical Society by Norman Wright, of the Dow Chemical Company, Midland, Mich. Furthermore, even those few drops can be returned unchanged after the test, for it consists merely in passing beams of invisible infra-red light through them.

The method, known as infra-red spectroscopy, depends on the fact that highly complex molecules of organic chemicals, that is, those containing carbon, produce characteristic "fingerprints" or patterns when the infra-red rays are spread out into a spectrum. Glass cannot be used to do this, because it is opaque to the rays. A two-pound prism of rock salt, however, separates the radiation into its various wavelengths.

If our eyes could see infra-red rays, we should view a spectrum, crossed by dark lines where certain wavelengths are absorbed by the molecules. Since the rays are invisible, and unable to affect even a photographic plate, they are detected with a thermopile, which measures their heating effect. This can detect a rise in temperature as small as a hundred-millionth of a degree.

The analysis method consists in plotting the pattern made by the absorption bands, and comparing this with the pattern for known organic substances. When the two match, just as when two fingerprints match, it is known that the same individual produced them.

Science News Letter, December 7, 1940

PALEONTOLOGY

Pre-Ice-Age Elephant Discovered In Siberia

THE SKELETON of a young elephant that lived in Siberia shortly before the pleistocene Ice Age has been unearthed near the town of Novosibirsk, according to word received by Dr. Ales Hrdlicka of the U. S. National Museum. Skeletal remains of mammoths belonging to the Ice Age itself are found quite abundantly in northern lands; but the new specimen is of an earlier type of elephant with straighter tusks, that rates as a great rarity. No entire skeleton of this species has ever been found in the USSR before.

The height of the skeleton is nearly nine feet, and the one tusk with it is five feet long. The bones are recognizable as those of a young animal because they are not hardened throughout but consist partly of cartilage.

Dr. Hrdlicka has forwarded to *Science,* the description he received from Novosibirsk.

Science News Letter, December 7, 1940

OCEANOGRAPHY

Bathysphere Being Built For Ocean Depths Study

A BATHYSPHERE is now under construction in Leningrad, a TASS dispatch received in the United States indicates. It is to be used for scientific study in oceanic depths.

Unlike previously constructed devices of its kind, the new Russian bathysphere will not require a ship to let it down and haul it up on a cable, the Soviet news agency states. The diving globe is expected to descend to depths of more than a mile and a half and to come to the surface again under its own power, controlled by its crew of two men. It is claimed that it will be able to remain submerged for ten or fifteen hours.

Science News Letter, December 7, 1940

CHEMISTRY

New Paint Kills Germs Long After Application

A PAINT that will kill the germ of typhoid fever nine weeks after the wall was painted, and still has some killing power after six years, was described by S. S. Epstein and F. D. Snell, of Foster D. Snell, Inc., Brooklyn, N. Y.

The paint was made with oils to which chlorine or iodine were added. Such paint also prevented the growth of mold and yeast, an important factor in damp atmospheres such as that of breweries, it was stated.

"Laboratory results were confirmed by practical determination that the bacteria or molds on the paints containing chlorine or iodine when used in hospitals or breweries were markedly reduced or nearly eliminated," it was reported. "Such a paint represents a step forward but is far from the ideal which may be reached or at least approximated sometime in the future."

Science News Letter, December 7, 1940

FORESTRY

Parachute Fire Fighters Found Most Economical

PARACHUTE-JUMPING forest fire fighters can save the government a good deal of money, it appears from experiences in the West, reported to the U. S. Forest Service.

The Forest Service keeps close track of the cost of suppressing forest fires. In 1934, a fire in the Nezperce National Forest in northern Idaho cost $12,000 to put out, when fire-fighting crews moved in by truck and on foot. During the fire season just closed, another fire occurred in the same area. This time two parachute jumpers formed the spearhead of the attack, and the cost was held down to $500.

Another comparison was made even more directly, when ten fires were reported in one day, on the Bitterroot National Forest in Montana. Two of them, in inaccessible areas, looked as though they might become bad ones, so planes flew over and dropped crews of "smoke jumpers," with tools and provisions. The other eight were attacked in the orthodox manner, by crews going on foot from roadheads.

It cost only $160 apiece to suppress the fires attacked by the parachutists. The ones put out by ground crews alone cost from $2,000 to $17,000 apiece.

Science News Letter, December 7, 1940

PHYSIOLOGY

Weathering Urged for Army

Men as Well as Airplanes Should Be Thoroughly Tested For Climatic Adaptability; Seasoning Makes Better Men

By JANE STAFFORD

THE YOUNG MEN in training camps this winter, and particularly the ones to follow in the spring draft call, are in for some scientific weathering, if U. S. Army officials follow the advice of Dr. Charles I. Singer, of Long Beach, N. Y.

They may get an ice cube test which will remind some of them of parties at which they played the trick of putting a piece of ice against some unsuspecting girl's bare arms or back. In the test, the ice cube is held against the skin for two seconds. If the skin does not redden within 10 seconds after removing the cube, it indicates poor reacting ability of the skin to temperature change.

Reason for this and other tests and for the scientific weathering is that America's defense army needs to be trained not only to fight but to stand sudden changes of climate and to keep up "peak performance" in the frosty Arctic regions of Alaska or the sweltering tropics of Central and South America, if we are planning for hemisphere defense.

We are spending $7,000,000 for an army aviation test station at Fairbanks, Alaska, to study the behavior of airplane motors in Arctic climates.

"This is a very necessary establishment," Dr. Singer states, "yet little provision has been made for testing the climatic adaptability of the most important military machine—the human body. Such tests," he declares, "should be conducted both at rest and during varying degrees of activity in different clothing."

Directions for such tests and for training men to adapt to climatic changes were given by Dr. Singer in a report to the *Journal of the American Medical Association*. Dr. Singer has had some experience with weathered and unweathered troops. During the World War in March, 1916, he was detailed as medical officer with two companies of infantry to clear up a high mountain road in the Austrian Tyrol which was buried under an avalanche of snow. The altitude was 14,000 feet.

"We started from the Adige valley with an average temperature of 60 degrees Fahrenheit to reach a wind-swept valley, the average temperature of which ranged from 30 to 35 degrees Fahrenheit," he relates.

"Company A had been stationed in the valley for about six weeks and was composed of raw recruits from cities. Company B had arrived 10 days previously after an all-winter campaign through Russian Poland—a company of seasoned, hardened fighters. It took us three days to accomplish our task, working in the snow, wind and rain 12 hours a day, and sleeping in the primitive deserted stone huts of mountain shepherds."

In the five-day period beginning with the first day of the assignment, the sick list for Company A was more than three times as large as that for Company B, the company made up of troops hardened in Russian Poland.

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MEASURE ABILITY TO STAND HEAT

Hemisphere Defense may involve fighting in the sweltering tropics. Working under conditions of high heat and humidity cause serious changes in the body leading to heat prostrations, impairment of efficiency and a lowering of safety standards through carelessness, scientists at the Pittsburgh research laboratory of the American Society of Heating and Ventilating Engineers discovered. Tests are being made on the subject whose hand extends from the "weather chamber."

ICE CUBE TEST

This measure of the skin's thermic reacting ability is suggested, among others, for finding out which of Uncle Sam's new soldiers will be able to fight effectively in the Arctic.

This shows, Dr. Singer comments, how general resistance to acute infections tends to be lowered by abrupt climatic change. In addition, such a change may bring to the fore latent and probably unsuspected diseases, such as tuberculosis, arthritis, heart disease and respiratory infections.

The hardening or seasoning process is therefore important if the soldier is to stay well and be an effective fighter. Gradual, slow changes in climate, such as we experience in the change from fall to winter, impose no hardship on the human organism, Dr. Singer says. A sudden change, however, such as would occur if troops were rapidly moved from temperate to subarctic regions, forces on the body the necessity for quick adaptation. Arteries and veins in the skin must remain constricted, to prevent loss of heat from the body, and the body fires must keep burning at a faster rate. If these processes are prolonged, harm may be done. Prolonged and repeated constriction of the arteries and veins in the lining of the nose, for example, lowers the resistance of the lining membrane which may pave the way for colds, influenza and similar ailments.

When such diseases attack soldiers in trench warfare, the men can be kept a short distance in the rear, considered as reserves, and returned to the front within a week or 10 days. In the modern style war of movement, such men are completely lost as effective fighters.

Soldiers must not only be able to adapt to sudden changes. They must be able to stand prolonged exposures to extremes of climate associated with physical strain. The annihilation of the Russian divisions north of Lake Ladoga in Finland shows this point. The Russians were healthy, hardy young men, dressed for the climate and trained in the Russian steam baths to stand sudden changes in temperature. But they could not stand prolonged exposure to the Nordic winter of Finland, Dr. Singer explains.

We Americans, following the instinct to seek comfortable temperature levels, have a limited comfort zone as a result of clothing and indoor heating, Dr. Singer declares.

"A systematic extension of the comfort zone by direct methods of hardening Americans troops, especially those who may face the rigors of Arctic warfare, is imperative for full fighting efficiency," he warns.

To accomplish this hardening, he recommends that troops start training in the fall. Those who start next April will require at least 10 months to acquire the adaptability to climate reached by the fall group in five months.

Our present training system of summer maneuvers in the North and winter maneuvers in the South should be completely reversed, in Dr. Singer's opinion, to provide troops trained for the rigors

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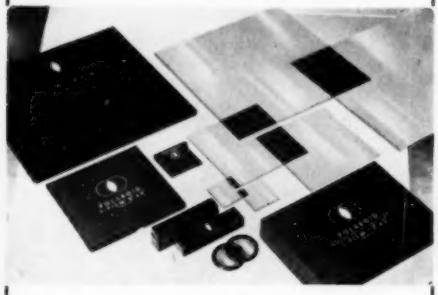

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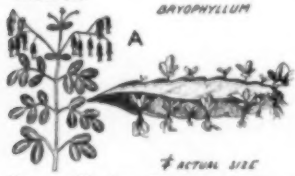
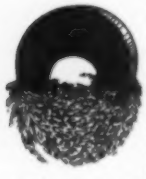


You will be interested in this rare sprouting leaf—a curiosity from tropical countries—Pin it to a curtain or place it on soil. New plants bearing clusters of lantern shaped flowers will sprout from each notch.



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of Alaska, say, or the mugginess of Central American tropics.

Surf or river bathing wherever possible, daily cool and gradually cooled showers, and treatment with alternating hot and cold streams of water will be useful, he says, to harden soldiers with poor climatic adaptability and to increase self-confidence and military morale.

Before sending units on duty to Alaska or the tropics or dry desert regions of hot days and cold nights, tests should be made of the men's climatic adaptability and endurance. Among tests recommended by Dr. Singer are determinations of the temperature at which men are chilled at different humidities and the temperature at which they start sweating at different humidities.

Another test is made by taking the pulse after forced forward bending. Those whose pulse rate slows more than 10 beats per minute after the forced forward bending are poor risks in climatic exposures unless hardened.

There is a best diet for each climate, Dr. Singer says. This should be used as far as possible to enhance the adaptation of troops to the climate. Many calories, much fat and much protein food, such as meat, cheese and eggs, are advised for cold climates. A low calorie diet with little fat and protein but lots of sugar and starch foods, is advised for the tropics. In both cold and tropic climates, vitamins and minerals must be supplied, because in the cold climates there is a scarcity of fresh fruits and vegetables, and in the tropics the soil lacks minerals.

Science News Letter, December 7, 1940

METEOROLOGY

Texas' Big Storm Started Up In Bering Sea Region

Was Meteorological Relative of Armistice Day Storm; Cold Mass from Arctic Met Warm Mass from Gulf

TEXAS' big storm (Nov. 24), that sheathed the northern Panhandle in glaze ice and at the same time "like to drowned" Galveston on the Gulf, was a meteorological relative of the Armistice Day blizzard that blocked the upper Mississippi valley with snow and drowned a lot of duck hunters.

Both storms originated in the same way, Principal Meteorologist C. L. Mitchell of the U. S. Weather Bureau told Science Service. A cold air mass, starting in the Arctic, slid down over the western part of the country, penetrated far enough to find a mass of warm air of Gulf origin, and proceeded to wring the water out of it in great quantities.

The Texas starm's air mass is known to have started either in western Alaska or eastern Siberia, for high-soaring balloons sent up from Fairbanks, Alaska, found no traces of it as it passed, while similar instrument-carriers from Anchorage got fairly into it. Striking into the United States proper near the Puget Sound region, it cut diagonally across country, to create the climax of its mischief in Texas.

There, in encounter with the moisture-bearing warm air mass from the south, it simply hung, almost immovable, while it rained and rained and rained. At Galveston, more than ten inches fell in 24 hours. In the Panhandle area precipitation was lighter, but the rain froze as it struck the cold ground level, sheathing everything with thick layers of wire-wrecking, tree-breaking, traffic-paralyzing ice.

Skirts of the storm were far-flung. There was rain to the north, as far as southeastern Colo- (*Turn to page 367*)

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SCIENCE NEWS LETTER
2101 Constitution Ave.
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DID YOU SEE the Announcement of the new membership plan which enables you to look at, try out, feel--and OWN unusual *Things* of science?

Now we can tell what happened!

Within nine days from the Announcement on September 21, 500 people joined, in three weeks, 1,000 joined—now, more than 1,500 members have joined! Here is the complete explanation:

What will Members get in the units of THINGS which start 1941?

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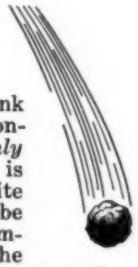


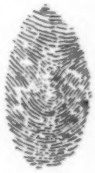
Members will receive an actual chunk from the heavens, a pebble of iron-nickel meteorite—one of *Earth's only imports* from the outer space! It is certified to be an actual meteorite fragment such as can usually be viewed only in certain museums. Members will also receive some of the sand pulverized by the tremendous *impact* of one of the largest meteorites ever to hit the Earth. With these materials members will receive a stirring explanation of this unusual exhibit.

FABRICS UNIT

Members will receive a piece of *cloth spun from glass;* a tuft of fiber *made from milk* which feels like wool; a silk-like cloth made from *salt, coal, lime and air;* a sheet of paper that feels like cloth; and other new fabrics which are products of scientific experiment.

FINGERPRINT UNIT

Fingerprinting is in the news these days. One thinks of impressing an ink-smudged finger on paper—a messy business. Members will receive an *inkless fingerprinting outfit* with material good for many impressions. There will be a purse fingerprint card that may sometime be useful to you in cashing a check, and two official complete fingerprint record documents which may be registered with the Government or kept in your safety deposit box. We'll tell you *how to classify* the arches, loops, whorls and composites in yours or any fingerprints.



New—THINGS units on Taste, Plastics, Heredity, Odors, Milk, Metals, Archaeology, to name a few of the units on which the Staff of Science Service is now working.

MESSAGE TO SCHOOLS

In addition to a clear explanation of the material in each unit of THINGS, we will supply a museum-style legend card of bristol board for use in a laboratory display cabinet. Instantaneous and enthusiastic was the gratification expressed by teachers for this feature when we announced it in connection with the first series of THINGS units.

A FASCINATING PROBLEM is now being solved. For years, we of the Staff of Science Service, the non-profit institution for the dissemination of scientific knowledge, have been asked questions like these:

How can I get a sample of *this* new substance? or
What does *that* new product feel like? or
My son asked me about this discovery, and I want to make it real to him—can you send me a *demonstration unit?*

In the past we had no way to meet these requests, but there have been so many of them that we have *now worked out a way.*

A new science group is being organized to receive THINGS of science. The first announcement appeared in SCIENCE NEWS LETTER eleven weeks ago. We set membership at 1,000 during 1940, restricting the offer to the United States.

In three weeks the 1,000 membership applications were received. But they *kept coming* even though we announced that the roster was closed. Applications are still coming. More than 1,500 memberships are now on record!

So, in justice to everyone and to give an additional group the opportunity to join, the Science Service Staff has conferred for the past five weeks with specialists in scientific centers. We can now announce *the increase of membership to a total of 5,000.* New membership applications will now be received until the 1941 roster, too, is closed.

To each member of this new group we will each month dispatch *a unit of scientific material,* unusual, intriguing, surprising. With each unit we supply a brief, clear explanation of its contents.

Since this is a non-profit organization, THINGS will not attempt to make money, so the membership charge has been set at $4. Membership can now continue for a longer period than was originally thought possible. The new membership period will reach from January 1941 through December 1941, during which time each member will receive *twelve* units of THINGS, one each month.

You are invited to become a member. Because we saw how *fast* the applications came in upon our first announcement a few weeks ago, we recommend that you send us the following application form *immediately* to make sure that your application will be included among the 5,000 for which provision is *now being made.*

MAIL THIS APPLICATION

To *Things*

2101 Constitution Avenue, Washington, D. C.

I hereby apply for membership in your new science group, and enclose $4 for the twelve units which are to be dispatched to me monthly, postage prepaid, from January 1941 through December 1941.

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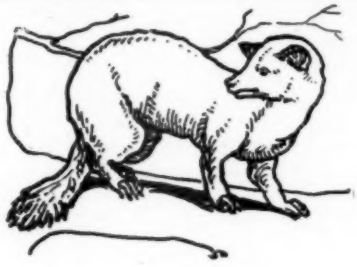
ZOOLOGY

NATURE RAMBLINGS

by Frank Thone



Mustelids

WHEN WE hear the word "carnivore" we automatically think of cats and dogs. Urged to add to the list of representatives, we may recall the ill fate of the bad boys who poked fun at a prophet, and remember that bears are meat-eaters, too. But it would probably take at least a little mental prodding to make us think of the members of the weasel tribe, the short-legged, long-bodied animals known collectively as the Mustelidae.

Yet these restless hunters are highly important, both in the economy of nature and in man's commercial reckoning. For they include the most valued fur-bearers sought by trappers in all the colder lands of the world. A mere list of their genera is a veritable catalog of the nobility among peltries: ermine, sable, otter, marten, mink, badger, fisher, skunk. Without the Mustelidae, fashion designers and the fur trade would be in a sad state.

Another group of persons interested in a different phase of wildlife look upon these short-legged carnivores with feelings exactly the opposite of those that trappers entertain for them. To the older-fashioned game warden, interested only in increasing the number of quail, pheasant and other birds to shoot at, all the Mustelidae are simply and unqualifiedly "vermin," because they do rob nests and kill birds. They would exterminate them to the last beast, if they could.

However, this extreme antipathy is fortunately passing, as a more modern type of wildlife management, based on a better understanding of ecology, tends to replace the older, more naively direct-minded variety of game raising. It is coming to be realized that the wildlife population of a given terrain is the healthier the more nearly it approaches a state of undisturbed nature—and nature includes a good deal of killing of supernumerary game birds and animals by hungry flesh-eaters. If man manages his own conduct as intelligently as weasel and skunk do theirs, there will still be plenty left for shooting.

Of course, the role of this long-bodied tribe in nature is not limited to killing the same things man wants to kill. Game birds and animals form only a minor part of the diet of the Mustelids. To a far greater extent, they prey upon the swarming rodent populations which might otherwise get completely out of hand. Some of them, like the skunk, for example, also have tremendous appetites for white grubs and other destructive forms of insect life. The Mustelidae pay for their place in the world with services worth even more than their costly furs.

Science News Letter, December 7, 1940

ENGINEERING

Hard Surface on Steel Provided by New Process

A SHELL of hard steel, containing more than 1% of carbon, can be produced on the surface of articles of softer steel by exposing them when heated to highly heated carbon-containing gases. This was reported before the American Chemical Society by W. A. Darrah, of the Continental Industrial Engineers, Inc., Chicago.

Methods somewhat similar have been used before, Mr. Darrah stated, but they left a coating of carbon scale, requiring expensive and annoying cleaning methods. In the new process, he announced, this is prevented by performing the carburizing operation in a muffle of refractory material, and preheating the gases to 1600 or 1700 degrees Fahrenheit.

The process is already being used commercially in one automobile plant, he said.

Science News Letter, December 7, 1940

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RADIO

Dr. Martin Grabau, manager of the technical division of the Polaroid Corporation, will describe some of the many applications of polarized light as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Dec. 12, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST.

Listen in on your local station. Listen in each Thursday.

From Page 364

rado and southwestern Kansas—where the Dust Bowl used to be—and rain to the east as far as Alabama.

Reports that the Panhandle had suffered from sleet were corrected to read "glaze" by the Weather Bureau. Sleet, as defined by meteorologists, means little, hard, round pellets of ice—frozen raindrops. Glaze is the solid coating of ice that forms when rain from a warmer overhead stratum strikes cold objects on or near the ground and freezes fast to them.

Science News Letter, December 7, 1940

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•First Glances at New Books

ZOOLOGY—FICTION

CHILDREN OF THE SEA—Wilfrid S. Bronson—*Harcourt, Brace,* 264 p., illus., $2. The artist-naturalist author of *Fingerfins, Paddlewings* and other well-known books on natural history that have charmed children and adults alike here for the first time tries his hand at fiction. This is a story of the birth and growth of a dolphin, and of his brief idyllic companionship with an amphibious Negro boy in the Bahamas. For youngsters who like animals, and who also like to read, a better Christmas gift book can hardly be found.

Science News Letter, December 7, 1940

EMBRYOLOGY

CONTRIBUTION TO EMBRYOLOGY, Vol. XXVIII, Nos. 170 to 178—*Carnegie Institution of Washington,* 451 p., illus., $4, paper; $5, cloth. A group of papers, most of them on the embryology of man and other primates, of more than casual interest to research workers in the subject. Kinetic and experimental approaches receive particular attention.

Science News Letter, December 7, 1940

ZOOLOGY

ATLAS OF OUTLINE DRAWINGS OF THE DOGFISH SHARK, THE NECTURUS, AND THE CAT FOR VERTEBRATE ANATOMY—Samuel Eddy, Clarence P. Oliver and John P. Turner—*Wiley,* 77 drawings, $1.50.

Science News Letter, December 7, 1940

PALEONTOLOGY

THE MAMMALIAN FAUNA OF THE WHITE RIVER OLIGOCENE — William Berryman Scott and Glenn Lowell Jepsen—Part III, Lagomorpha, by Albert Elmer Wood; 91 p., 2 pl., $1; Part IV, Artiodactyla, by William Berryman Scott, 383 p., 42 pl., $2.50—*American Philosophical Society.* Two more monographs, carrying forward the monumental work of fully describing the fauna of the classic White River Oligocene.

Science News Letter, December 7, 1940

TECHNOLOGY

A. S. T. M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS (Sept., 1940) —*American Society for Testing Materials,* 354 p., $2. Methods of testing, specifications, definitions, charts and tables are given.

Science News Letter, December 7, 1940

ENGINEERING

FACTORS AFFECTING THE COST OF REFUSE COLLECTION, Bull. 10, 31 p., REFUSE COLLECTION METHODS, Bull. 11, 55 p., REFUSE COLLECTION EQUIPMENT, Bull. 12, 58 p., illus.—*American Public Works Assoc.,* 50c each. Besides public works engineers, these pamphlets should be useful to anyone concerned with municipal affairs and their improvement.

Science News Letter, December 7, 1940

CHEMISTRY—PHOTOGRAPHY

PHOTOGRAPHIC CHEMICALS, Their Properties and Uses—Henry M. Lester—*Morgan and Lester,* 25 p., 50c. This constitutes quarterly supplement No. 3 to the "Photo-Lab-Index." Concise descriptions are given for all important photographic chemicals, including chemical formulae, uses, etc.

Science News Letter, December 7, 1940

CHEMISTRY—ECONOMICS

FOOD INDUSTRIES MANUAL—W. B. Adam, comp. and others—*Chemical Pub. Co.,* 311 p., $4. Though prepared in England, and emphasizing British practice, this very detailed encyclopedic work should prove valuable to persons in the United States concerned with the preparation or distribution of food.

Science News Letter, December 7, 1940

MEDICINE

MENTAL HEALTH SENTINEL, Vol. I, No. 1, October, 1940—*Massachusetts Society for Mental Hygiene, 3 Joy Street, Boston, Mass.,* $1 per year (Quarterly). This new magazine contains good reading for laymen interested in the mental health of their own families and of the community as well as information for physicians.

Science News Letter, December 7, 1940

BIOLOGY—CHEMISTRY

LABORATORY MANUAL OF BIOCHEMISTRY —Benjamin Harrow and others—*Saunders,* 119 p., illus., $1.50. A well-worked-out laboratory manual, for courses not hitherto at all well supplied with aids of this kind.

Science News Letter, December 7, 1940

AGRICULTURE

PLOWING THROUGH, The Story of the Negro in Agriculture—Edwin Ware Hullinger—*Morrow,* 59 p., illus., $1.50. The story of the Negro farmer's struggle from hard times to better times briefly but dramatically told, in text and pictures.

Science News Letter, December 7, 1940

PALEONTOLOGY

A SYSTEMATIC STUDY OF THE FOSSIL GASTROPOD EXILIA — Herdis Bentson — *Univ. of Calif. Press,* 38 p., 3 pl., 50c.

Science News Letter, December 7, 1940

TYPOGRAPHY

HOW TO MAKE TYPE READABLE, A Manual for Typographers, Printers and Advertisers—Donald G. Paterson and Miles A. Tinker—*Harper,* 209 p., $2.50. A striking study of printed matter which is so important for the transmission of intelligence these days. The authors are University of Minnesota psychologists. Typographers, printers and advertising writers will seize upon the conclusions, some of which may well surprise them. For the transmission of the experimental details, supporting the many tables in the volume, Appendix II of 36 tables is issued in microfilm or photocopy form through the American Documentation Institute under its auxiliary publication plan, thus taking to the specialist the information that he needs without burdening the ordinary reader with detail and ordinary cost.

Science News Letter, December 7, 1940

CHEMISTRY

CALCULATIONS OF QUALITATIVE ANALYSIS—Louis J. Curtman and Sylvan M. Edmonds—*Macmillan,* 156 p., $2. A text-book for students of chemistry that should help them to master theoretical principles, and also prepare them for quantitative analysis.

Science News Letter, December 7, 1940

CHEMISTRY

PORTLAND CEMENT, Theories (Proven and Otherwise) and Specifications—P. H. Bates—*Amer. Soc. for Testing Materials,* 31 p., illus., 50c., (Fifteenth Edgar Marburg Lecture, 1940).

Science News Letter, December 7, 1940

ELECTRICAL ENGINEERING

ELECTRICAL CIRCUITS AND MACHINERY, Vol. I, Direct Currents— Frederick W. Hehre and George T. Harness—*Wiley,* 513 p., illus., $4.50. This book is intended as a general text-book for non-electrical engineering students, and as an introductory text for those in electrical engineering. Vol. II, to appear later, will cover the field of alternating current.

Science News Letter, December 7, 1940

MATHEMATICS

A TREATISE ON ADVANCED CALCULUS —Philip Franklin—*Wiley,* 595 p., $6. This work is, to quote the preface, "addressed to a reader who has already acquired some proficiency in the technique of the calculus and who desires a more logical treatment of the subject than is feasible in a first course."

Science News Letter, December 7, 1940